DOCKABLE CELLULAR PHONE

BACKGROUND OF THE INVENTION

1. Technical Field:

[0001] This invention relates generally to wireless communication, and in particular to wireless phones used to connect a computer with a computer network. Still more particularly, the present invention relates to a cell phone that can be directly plugged into a computer to provide wireless communication between the computer and the computer network using an existing port or socket in the computer.

2. Description of the Related Art:

[0002] While most early generation and many present generation computers are hardwired when connected to a network, a popular alternative is wireless connections. Such wireless connections are usually to a local area network (LAN) via a radio connection in compliance with the IEEE 802.11 standard. A typical LAN/computer connection is illustrated as a LAN **100** in **Figure 1**.

[0003] A computer **102** is connected to a wireless transceiver **104**. Wireless transceiver **104** communicates via radio waves to a wireless router **106**, which connects to a network **110** (typically the Internet) via a modem **108**, which may be a true modulator/demodulator if the connection to network **110** is an analog dial-up connection, or simply a router or hub if the connection to network **110** is via a digital line, such as a cable, an ISDN (Integrated Services Digital Network) adapter, etc.

[0004] With reference to **Figure 2a**, wireless transceiver **104** is often connected to computer **102** via a Personal Computer Memory Card International Association (PCMCIA) PC card socket **202**, shown in **Figure 2b**. Communication between computer **102** and wireless router **106** is

accomplished by entering commands using a keyboard **204**. For purposes of clarity later, note that keyboard **204** is part of a base **210**, which couples to a display **206** using display hinges **208**.

[0005] A limitation to LAN **100** is that wireless transceiver **104** must be within range of wireless router **106**, typically less than 150'. If a user wishes to be able to connect to network **110** and be able to move about farther away, then another wireless system must be employed. For example, a cell phone system, such as shown in **Figure 3**, may be used. Computer **102** can connect to a modem **302**, which if external must be connected to computer **102** via a cable **310** connecting port **306a** to port **306b**, as shown. Modem **302** must connect to an external cell phone **304**, which connects via another cable **312**, which is inserted into ports **308a** and **308b**.

[0006] In the system depicted in **Figure 3**, a user calls a dial-up Internet Service Provider (ISP) **306**, which provides a gateway to network **110**. Such systems are cumbersome, however, as they require connection cable **312** between modem **302** and cell phone **304**, as well as appropriate and often proprietary (customized) ports **308**

[0007] Thus, there is a need for a method and system that allows a user to utilize a cell phone to provide a wireless communication to an ISP without the need for external cables or customized ports.

SUMMARY OF THE INVENTION

[0008] As will be seen, the foregoing invention satisfies the foregoing needs and accomplishes additional objectives. Briefly described, the present invention provides a system that permits a cell phone user to insert a cell phone, which has a PCMCIA compliant connector, directly into a computer's PC card socket.

[0009] The cell phone is hinged about a first component and a second component. The first component includes a keypad appropriate for dialing up an Internet service provider (ISP), and the second component is PCMCIA compliant to couple directly in an existing PC socket of the computer. Thus, the cell phone requires no additional cables or modified ports to provide a seamless connection to a dial-up ISP.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as the preferred modes of use, further objects and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

[0011] Figure 1a depicts a prior art Local Area Network (LAN) using an IEEE 802.11 connection;

[0012] Figures 2a-b illustrate the use of a PC card socket for connecting an IEEE 802.11 Wi-Fi transceiver;

[0013] Figure 3 depicts a system using a dial-up Internet Service Provider (ISP);

[0014] Figures 4a-c depict a cell phone having an integrated PC Card interface;

[0015] Figure 4d illustrates the cell phone inserted in a PC Card socket in a computer;

[0016] Figures 5a-c depict the cell phone having a USB compliant plug;

[0017] Figure 5d illustrates the cell phone inserted in a USB port in the computer;

[0018] Figure 6 depicts an exemplary cell phone system used by the present invention; and

[0019] Figure 7 illustrates an exemplary embodiment of the computer using the inventive cell phone.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0020] Referring now to the drawing figures, in which like numerals indicate like elements or steps throughout the several views, the preferred embodiment of the present invention will be described. In general, the present invention provides an improved method and apparatus for connecting a cell phone to a computer.

[0021] With reference now to **Figure 4a**, there is depicted a cell phone **400** in a preferred embodiment of the present invention. Cell phone **400** includes a first component **402** permanently connected to a second component **404** by hinges **410**. First component **402** includes an internal speaker **406**, a display **420** for displaying telephone numbers, messages, etc., a keypad **408** for dialing telephone numbers, searching databases, etc., and an antenna **422.** Second component **404** includes an internal microphone **412** and an electrical connector **414**.

[0022] In a preferred embodiment, second component **404** has dimensions that allow physical insertion into an existing interface port of a computer, such as PC card socket **202** shown in **Figure 2b**. To be capable of such a physical insertion, second component **404** preferably has a width of 54.0 millimeters (mm) and a length of 85.6 mm. In a preferred embodiment, the thickness of second component **404** is 5.0 mm, in order to mimic a Type II PC Card. Alternatively, the thickness of second component **404** is 3.3 mm, in order to mimic a Type I PC Card, or the thickness of second component **404** is 10.5 mm., in order to mimic a Type III PC Card. Note that all references herein to PC Cards and PCMCIA are understood to refer to devices that are compliant with PCMCIA Standard Release 2.1/JEIDA 4.2 – July 1993 and/or earlier/later releases, and/or PC Card Standard 8.0 Release – April 2001 and/or earlier/later releases, published by the Personal Computer Memory Card International Association (PCMCIA), which are herein incorporated in their entirety by reference.

[0023] In an alternative embodiment, cell phone **400** has an external microphone **416**, shown in **Figure 4b**, that hinges about a swivel **418**. External microphone **416** can swing down, as shown in **Figure 4c**, when cell phone **400** is being used as a standalone voice telephone.

[0024] Referring now to **Figure 4d**, when second component **404** is inserted into PC card socket **202**, first component **402** is able to swivel around hinges **410**. Thus, if the reception

quality of cell phone **400** varies according to the position of antenna **422**, hinge **410** permits first component **402** to swing as shown, permitting the repositioning of antenna **422** to achieve optimal reception.

[0025] With reference now to **Figures 5a-c**, an alternative embodiment of cell phone **400** utilizing a serial plug **502** is illustrated. Serial plug **502** may be a Universal Serial Bus (USB) compliant connector, an IEEE 1394 (often referenced as "FireWire"™) compliant connector, or other similar high-speed serial connector. **Figure 5b** depicts a top view of cell phone **400**, and **Figure 5c** illustrates a front view of cell phone **400**.

[0026] As known to those skilled in the art of computer peripheral device interfaces, the USB specification was prepared by representatives of Compaq Computer Corporation, Hewlett-Packard Company, Intel Corporation, Lucent Technologies Inc., Microsoft Corporation, NEC Corporation, and Royal Philips Electronics (Philips). Peripheral device interfaces that comply with the specification are referred to as USB interfaces and have been included in many recently developed personal computer systems. Such USB devices are generally referenced as either low-speed devices, capable of transferring data at a rate of 1.5 Megabits per second (Mb/s); or high-speed devices (also called full-speed devices) capable of transferring data at 12Mb/s. Under the USB 2.0 specification, full-speed devices are capable of using 40x multipliers for a transfer rate of 480Mb/s, and such USB devices are typically known as true high-speed devices.

[0027] As shown in **Figure 5d**, serial plug **502** is directly physically inserted into a serial port **506**, which corresponds with the type of serial plug **502**. That is, if serial plug is IEEE 1394 compliant, then serial port **506** is likewise IEEE 1394 compliant in physical size and dimensions, as well as electrical and communication protocols. Similarly, if serial plug is USB compliant, then serial port **506** is likewise USB compliant.

[0028] Referring now to **Figure 6**, there is depicted an exemplary block diagram of a wireless telecommunications system for implementing the present invention. Cell phone **400** communicates with a base station **604**, which transceives signals to a Mobile Telephone Switching Office (MTSO) **600**. MTSO **600**, also known as a Mobile Switching Center (MSC), aggregates and switches calls from cell phones in network of mobile phones. In a preferred

embodiment of the present invention, MTSO **600** also has a signal identifier **610** that identifies what type of signal is being received from cell phone **400**. That is, the signal may be either a modulated signal, or it may be a packet.

[0029] If the signal is a modulated signal, then data from computer **102** is modulated onto a carrier signal, which may be either digital or analog. This modulated signal is circuit switched, like a voice signal, to a Public Switched Telephone Network (PSTN) **614**. PSTN **614** then routes the modulated signal to a dial-up Internet Service Provider (ISP) **306**, which connects to network **110**, which is preferably the Internet. In this preferred embodiment, a modem **602** is required to modulate the carrier signal with data from computer **102**. As the dotted lines indicated, modem **602** may be integrated into cell phone **400**, may be integrated within computer **102**, or it may be a standalone device. In the preferred embodiment, modem **602** is integrated into either cell phone **400** or computer **102**, in order to take advantage of the direct connection afforded between cell phone **400** an a port in computer **102**.

[0030] If the signal from cell phone **400** is identified by signal identifier **610** as a data packet, then MTSO **600** utilizes a packet converter **608**. If cell phone **400** is communicating using digital data packets, these data packets must be compliant with industry standards. For example, these data packets must be compliant with a protocol such as General Packet Radio Services (GPRS), Global System for Mobile wireless service (GSM), Enhanced Data GSM Environment (EDGE), X.25 protocol of Consultative Committee for International Telegraph and Telephone (CCITT), Universal Mobile Telecommunications Service (UMTS), etc. All cited protocol standards are cited by reference in their entirety.

[0031] Communication with the Internet requires data to be in a Transmission Control Protocol / Internet Protocol (TCP/IP). Therefore, data packets from cell phone **400** must be converted from the cell phone data packet protocol (such as GPRS) to TCP/IP using packet converter **608**. Once converted into the TCP/IP format, the data packet is then sent to a gateway **612**, preferably part of an ISP (not shown), which accesses Internet network **110**. While the data packet conversion has been shown for exemplary purposes only as going from GPRS to TCP/IP format, it is understood to be within the scope and spirit of the present invention that this data

packet conversion may be from any format broadcasted from cell phone **400** to any format used by network **110**.

[0032] Referring now to **Figure 7**, there is depicted a block diagram of a preferred embodiment of computer **102**. Within computer **102**, a Central Processing Unit (CPU) **702** connects via a processor interface bus **704** (also referred to in the art as a "front side bus," "host bus," or "system bus") to a North Bridge **706**. North Bridge **706** is a chip or chipset arbiter logic circuit having a memory controller **708** connected to a system memory **710**. A video controller **712** is coupled to North Bridge **706** and a video display **714**. Also connected to North Bridge **706** is a high speed interconnect bus **720**. North Bridge **706** is connected via interconnect bus **720**, which may be a Peripheral Component Interconnect (PCI) bus, to a South Bridge **722**.

[0033] South Bridge **722** is a chip or chipset Input/Output (I/O) arbiter that includes the necessary interface logic to convey signals from interconnect bus **720** to (typically slower) I/O interfaces, including a Super I/O **734**. Super I/O **734** is a chip or chipset including necessary logic and interfaces for a parallel port **736** and a non-USB (Universal Serial Bus) serial port **744**, as are understood in the art of computer architecture. Super I/O **734** may also include controllers for non-USB devices such as a keyboard controller **740** for a non-USB keyboard and an Enhanced Integrated Device Electronics (EIDE) port **742**, to which is connected a Compact Disk – Read Only Memory (CD-ROM) drive (not shown). Also connected to Super I/O **734** is a floppy disk controller **738**, which supports an interface with one or more floppy disk drives (not shown).

[0034] If interconnect bus **720** is a PCI bus, that a PCI/PC card controller **716** can be used to interface with a PC Card socket **718**, which includes one or more 68-pin PC Card sockets. Similarly, coming off South Bridge **722** may be an International Standard Architecture (ISA) bus **746**, which communicates with an ISA/PC Card controller **728**, which provides an interface between ISA bus **746** and PC Card socket **730**, which may be the same as PC Card socket **718** is appropriate control circuitry (not shown) is provided. In addition, South Bridge **722** can support a Card Bus **746**, which provides a 32-bit connection directly to a PC Card socket **732**, which may also be the same as PC Card sockets **730** or **718**.

[0035] Coupled with South Bridge **722** is a USB host controller **724**, which provides a USB socket **726** from USB compliant devices (not shown) to computer **102** and CPU **704**. USB compliant devices may be floppy disk drives, CD-ROM drives, keyboards and other peripheral devices that are configured to comply with the "Universal Serial Bus Specification" release 2.0, April 27, 2000 (USB.org), which release or later is herein incorporated by reference in its entirety. For example, USB socket **726** may be directly connected to USB serial plug **502** shown in **Figure 5a**. USB host controller **724**, which is likewise USB compliant, may be implemented in a combination of hardware, firmware and/or software.

[0036] Although not shown in **Figure 7**, a modem may be incorporated to modulate data onto a carrier signal being sent to any PC Card socket. This modem may be oriented in any technically feasible location within computer **102**.

[0037] The present invention has been described in relation to particular embodiments that are intended in all respects to be illustrative rather than restrictive. Alternative embodiments will become apparent to those skilled in the art to which the present invention pertains without departing from its spirit and scope. Accordingly, the scope of the present invention is defined by the appended claims rather than the foregoing discussion.